



## QUARTERLY PROGRESS REPORT

Project Title:	Development and Evaluation of Geotechnical Design Parameters Using the Seismic Piezocone		
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Mr. Anthony Chmiel		
TASK ORDER NUMBER/Study Number: 88-04 / 4-23932	PRINCIPAL INVESTIGATOR: Dr. Ali Maher		
Study Start Date: 06/01/2000 Study End Date: 10/30/2001	Period Covered: 4 <sup>th</sup> Quarter 2001		

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	10%	100%	100%	10%
1. Field Testing	40%	5%	100%	40%
2. Laboratory Testing	20%	5%	100%	20%
3. Calibration	10%	5%	100%	10%
4. Reporting	20%	70%	80%	16%
Final Report				
<b>TOTAL</b>	<b>100%</b>			<b>95.5%</b>

### 1. Progress this quarter by task:

The final report is being completed. The report is essentially broken up into 3 sections; ability of the piezocone to determine soil classifications, the ability of the piezocone to estimate the SPT N-value, and also the seismic piezocone's ability to be used as a downhole seismic test. Testing was conducted at 5 sites throughout New Jersey (Elizabeth, Jersey City, Old Bridge, Sea Isle City, and Woodbridge). This provided a wide range of soil types to be evaluated. It was generally found that the piezocone could determine the soil type during penetration without taking samples. However, the silt-mix range of soil classifications (silty clay, clayey silt, etc.) does have its limitations on accurately determining the classification. The classification system is better at determining the difference between sands, silts, and clays.

Comparisons were also made between the piezocone's SPT N-value correlations and actual values determined at the site by borings conducted within the general area of the piezocone test. Results show that the piezocone has the potential for SPT N-value estimation; however, the actual SPT N-value data must be corrected for energy efficiency. The piezocone's estimates are based on a 60% energy. Therefore, efforts must be made to correct the actual SPT N-value data to 60%.

The seismic evaluation was conducted in 2 ways. The first dealt with comparing the downhole piezocone method to traditional downhole and crosshole tests. The results show the piezocone downhole test is highly comparable to the traditional methods. The second evaluation was conducted by comparing statistical correlations based on the piezocone data to actual seismic measurements from the seismic piezocone. The statistical correlations were broken up into correlations used in sands, clays, and a universal correlation used for all soil types. It was shown that the universal equation could predict the shear wave velocity with a high degree of confidence without having to break up the data for soil specific correlations.

A final section of the report is devoted to the potential use of a 3-pore pressure element piezocone and how it one could benefit from its use, especially in stress history determination and soil layering estimates.

### 2. Proposed activities for next quarter by task:

- A. Finish writing draft copy of final report.



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3. List of deliverables provided in this quarter by task (product date)

N.A.

4. Progress on Implementation and Training Activities

N.A.

5. Problems/Proposed Solutions

N.A.

6. Budget Summary\*

Total Project Budget(# of years)	1 Year	\$30,000.00
Total Project Expenditure to date		\$29,941
% of Total Project Budget Expended		100%
Task Order Number/Study Number:		88-04 / 4-23932
Current Task Order Budget (# of years)	Year 1	\$30,000.00
Actual Expenditure to date against current task order		\$29,941
% of current task order budget expended		100%

\* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.

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